LEAD TECHNICAL ABSTRACTS

11

April 1961

LEAD DEVELOPMENT ASSOCIATION

LEAD TECHNICAL ABSTRACTS 11

A selection of Abstracts of Literature and Patents
on the Utilisation of Lead and its Alloys

Contents

Issued by
LEAD DEVELOPMENT ASSOCIATION
34 Berkeley Square, London, W.1 · Grosvenor 8422

PART 1 · TECHNICAL PAPERS

In the event of books, documents, articles and patents, quoted in Lead Technical Abstracts, being unobtainable from or through local libraries, technical booksellers (many of whom provide an international service) or appropriate government departments, applicants should notify their difficulties to the Association, which will do its best to assist.

ALLOYS

606 Lead Tungsten Bronzes — **R. A. Bernoff and L. E. Conroy**

J. of the American Chem. Soc., Vol. 82, No. 24, p. 6261, Dec. 20, 1960.

Description of a series of crystalline lead tungsten bronzes.

607 The Carbide Method of Producing a Lead-Calcium Hardener Alloy — **V. V. Rodyakin**

D.S.I.R. Translation RTS.1520 from Tsvetnye Metally, April, 1958, 31(4), 43–49. D.S.I.R., L.L.U., 20 Chester Terrace, London, N.W.1. 15s.

ANALYSIS

608 The Determination of Copper in Lead and Lead Cable-Sheathing Alloys — **J. H. Thompson and M. J. Ravenscroft**

Analyst, Oct., 1960, 85, 735–738.

Extraction of copper with diethylammonium diethyldithiocarbamate. Spectorphotometric determination of blue copper-biscyclohexanone oxalyldihydrazone complex. Normal amounts of Sb, Sn, Cd, Bi, Te, Ag, Zn and As, do not interfere.

609 Works Analysis of Cast Lead Bronzes — **H. Körner**

Metall, Nov., 1960, 14(11), 1106–1107.

(In German.) Analysis of lead bronzes to German Specification DIN 716 by volumetric or gravimetric methods. Determination of major constituents ranging from 83/5/10 to 67.5/22/5 Cu/Pb/Sn and impurities.

ATOMICS

610 Materials for Portable Nuclear Reactors — **E. J. Mullarkey**

Materials in Design Engineering, Oct., 1960, 52(4), 107–114.

Discusses various aspects of portable reactors for research and training purposes including, among other things, the shielding materials.

611 The Production of Nuclear Components in Lead and Graphite: Method Employed by Graviner Manufacturing Co Ltd. — **S. C. Poulsen**

Machinery, Jan. 4, 1961, 98, 4–14.

Description of production of interlocking lead bricks for Radiation Shielding. Describes specially designed plant for melting and casting 2, 4, 7, 9 and 10 inch thick bricks in 4% antimony alloy. Also covers machining of cast bricks; finishing and radiological inspection. Production of ball and socket bricks for remote handling also described.

BATTERIES

612 **Oscillographic Investigation of the Formation of a Basic Lead Sulphate $PbO.PbSO_4$ as an Intermediate Product in the Intermittent Electrostatic Charging of the $Pb/PbSO_4/PbO_2$ System** — **R. W. Ohse**

Werkstoffe u. Korrosion, April, 1960, 11(4), 220–223.

(In German.) A study of electrode reactions in the lead-acid cells.

BEARINGS

613 **Testing Full-size Heavily-Loaded Plain Bearings in an Alternative-Load Bearing-Testing Machine** — **O. Holfelder**

Sulzer Tech. Rev., 1960, 42(1), 37–44.

Describes construction of Sulzer bearing-testing machine for development of new plain bearings for high loads in medium-power diesels. Considers various bearings including thick-walled white-metal bearings with steel and bronze backings, tri-metal, lead-bronze flash bearings.

614 **Bearing Materials** — **P. G. Forrester**

Metallurgical Reviews, 1960, 5(20), 507–549.

Surveys forms of plain bearings; functions of bearing material; requirements and testing, strength; running and corrosion problems and hardness/fatigue strength compromise. Detailed discussion of various types of bearing including white metals and copper-lead alloys. Considers comparative performance of various materials including dry materials. 156 references.

CABLES

615 **Olympic Cables Pty. Ltd.: New £3,000,000 Factory, Tottenham, Victoria (Australia)** — **Olympic Cables Pty. Ltd.**

Australasian Engineer, May, 1960, 52, 66–67.

Discussed plant for manufacturing lead-covered and other cables.

CASTING

616 **Diecasting: Engineers' Digest Survey No. 8** — **H. K. Barton**

Eng. Digest, Dec., 1960, 21(12), 73–137.

Present and prospective applications of pressure die-casting; properties of various alloys including lead alloys. Trade directory listing die-casting producers, alloys, dies and other accessories.

COATINGS

617 **How to Choose Lead Linings for Process Vessels** — **R. L. Ziegfeld**

Chem. Eng., Vol. 68, No. 2, p. 147, Jan. 23, 1961.

Description of five different ways of lead-lining a vessel. Choice of method based on operating conditions considered in connection with lead's properties.

CORROSION

618 **Methods and Experience in Underground Cathodic Protection. Part 1—Lead Sheathed Communication Cables** — **O. Henderson**

Corrosion, Jan., 1961, 17(1), 45t–46t.

Methods of minimising corrosion by a U.S. telephone company. Controlled drainage connections; forced drainage systems and use of rectifiers and Mg anodes to overcome anodic conditions.

619 **Impressed Current Anodes for Cathodic Protection** — **W. P. Noser**

Corrosion, Dec., 1960, 16(12), 587t–592t.

History of cathodic protection of underground structures. Calculation data and recommendations for installation. Brief section on submarine structures mentions lead anodes for sea water.

620 **New Developments in the Mitigation of Corrosion in the Utility (Electrical Power Distribution) Field** — **E. H. Thalmann**

Corrosion, Nov., 1960, 16(11), 543t–552t.

Discusses cathodic protection of lead cable sheaths.

621 **Materials of Construction for Chemical Plant. Part 2—Lead** — **H. C. Wesson**

Chemical and Process Engineering, June, 1960, 6 pp.

An earlier version of this paper was published in "Corrosion Engineer", December, 1959. Extensions in this paper cover history, geology of galena, smelting and refining. Lists corrosive effects on lead of various inorganic and organic chemicals.

622 **Engineering Design for Corrosion Prevention** — **M. R. Fordham**

Australian Corrosion Engineering, Oct., 1960, 4(10), 5–20.

A general discussion of the problem, followed by sections on dissimilar metals in contact (table); metals in concrete and material selection. 16 references.

623 **Corrosion and Organic Materials** — **G. Dechaux**

Corrosion et Anticorrosion, Nov., 1960, 8(11), 419–420.

(In French.) Surveys British and American work on corrosion of metals by vapours from a variety of organic substances.

624 **Non-Ferrous Metals in Contact with Concrete** — **J. Singleton-Green**

Brit. Power Eng., Nov., 1960, 1(6), 59–61.

The corrosive effect on lead and other metals in contact with aluminous and Portland cements. 17 references.

625 **Practices and Experience with Protective Jackets for Outside Plant Lead- and Aluminium-Sheathed Cable** — **National Association of Corrosion Engineers (U.S.)**

NACE Tech. Ctte. Report (NACE Pubn. 60–14).
Corrosion, Nov., 1960, 16(11), 563t–570t.

Summary of experience of American and Canadian Companies. Contains a large amount of valuable information.

626 **Some Observations on the Interaction of Liquid Sodium with Cast Irons and Plain Carbon Steels** — **A. A. Smith and G. C. Smith**

J. Iron Steel Inst., Sept., 1960, 196(1), 29–42.

Mainly interested in the action of liquid sodium but also discusses the general mechanism of the process and describes the effect of other liquid metals including lead.

ELECTROLYSIS

627 **Obtaining Calcium Babbits and Alloys by Electrolyzing Fused Salts on a Moving Lead Cathode** — **I. T. Cul'din et al.**

Soviet Journal of Non-Ferrous Metals, Vol. 1, No. 6, p. 65, June, 1960.

Report on the electrolytic pilot plant.

EQUIPMENT

628 **Electrically Heated Lead Melting Installations, Particularly for Cable-Sheathing Presses** — **H. Riemann**

Wire (English edition of Draht), Dec., 1960, No. 50, pp. 233–238.

Covers all aspects from preparation of alloys and precautions, to avoid segregation to design of melting trough and use of protective gas covers. Well ilustrated.

METALLURGY

629 **Phase Relationships in the Systems Fe-Pb-Ni, Fe-Ni-C(Sat) and Fe-Pb-Ni-C; 1300 to 1550C** — **K. O. Miller and J. F. Elliott**

Trans. AIME Met. Soc., Oct., 1960, 218(5), 900–910.

Derivation of temperature composition diagrams for nickel-lead, iron-lead, iron-nickel-lead and nickel-lead-carbon systems. Results summarised at 1550°C in a quaternary phase diagram.

630 **Growth from the Vapor of Large Single Crystals of Lead Selenide of Controlled Composition** — **A. C. Prior**

J. of the Electrochem. Soc., Vol. 108, No. 1, page 82, Jan., 1961.

A new method of growing lead selenide crystals by sublimation has been developed. By this method, one single crystal is frequently made from a complete charge of a few grammes.

MISCELLANEOUS

631 **Determination of the Specific Volume of Liquid Copper-Lead Alloys** — **T. Malmberg**

J. Inst. Metals, Dec., 1960, 89(4), 137–139.

Determinations over a complete range of copper-lead alloys from OHFC copper to 99.95% lead using a vitreous quartz pyknometer. Tests carried out at 970° and 1110°C.

632 **How to Select the Right Gasket Material** — **J. J. Whalen**

Product Eng., Oct. 3, 1960, 31(41), 52–56.

Information on lead and other gasket materials including design methods, minimum seating stresses, safety factors, etc.

PLATING

633 **Barrel Plating Solutions** — **F. J. La Manna**

Met. Finishing, Oct., 1960, 58(10), 66–70.

Gives solutions and operating conditions for barrel plating with lead and many other metals.

634 **Chromium Plating of Rifle Barrels** — **R. J. Girard and E. F. Koetsch, Jnr.**

Pp. 199–206.

Plating the bore and chamber of the M.14 Springfield Rifle. Covers lead-tin plating anodes. Gives considerable practical detail.

SOLDERS

635 **Finished Printed Circuits at G.E.C.** — **General Electric Co. Ltd.**

Product Finishing, Oct., 1960, 13(10), 69–71.

Production techniques at the G.E.C., Coventry, television factory. Includes details of mechanical soldering machine.

SOUND ATTENUATION

636 **Improved Sound Barriers Employing Lead** — **Lead Industries Association, U.S.A.**

Brochure A.I.A. No. 39, 1960, 12 pp. Lead Industries Association, 292 Madison Avenue, New York 17.

Report by Bolt, Beranek and Newman for L.I.A. Lists advantages and applications of lead in sound insulation of buildings and mechanical equipment. Describes engineering and design calculation methods and concludes lead superior to other materials tested.

STATISTICS

637 **The Foreign Mineral Trade of the U.S.S.R. in 1959** **A. Gakner and D. J. Frendzel**

Mineral Trade Notes, Sept., 1960, 51(3), Special Supplement No. 60. 72 pp. (U.S.) Bureau of Mines, Washington, D.C.

1959 trade statistics for Russia based on official and other sources. Imports and exports by individual countries.

TETRAETHYL LEAD

638 **Taking Aim at TEL**

Chem. Week, Vol. 88, No. 5, p. 21, Feb. 4, 1961.

Discusses production plans for tetraethyl and tetraethyl lead by the Houston Chemical, Stepan Chemical and Callery Chemical.

PART 2 · PATENTS

BATTERIES

639 Protection of Negative Plate — **Chloride Batteries Ltd.**

Australian Patent 59,366/60

The active material of a negative plate for a dry charge battery may be protected from deterioration by coating the individual particles with a lead soap or a mixture of lead soaps.

640 Protection of Negative Plate — **Electrical Storage Battery Co.**

British Patent 858,325

The active material of the negative plate for a dry charge battery is protected, after formation, by a film of hydrocarbon residue. After the plate is formed it is exposed to the vapour of a petroleum fraction, having a boiling point of about 300°C. The component is next heated in an inert atmosphere to drive off excess moisture.

641 Grid Alloy — **Accumulatoren-Fabrik A.G.**

Belgian Patent 588,499

The quantity of arsenic added to a lead-antimony-copper alloy should be confined to the range of 0.01%–0.075%. This is sufficient to stabilise the alloy and to effect the necessary corrosion resistance without giving rise to the formation of arsine.

642 Battery Plate — **Pritchett & Gold & E.P.S. Co. Ltd.**

British Patent 860,211

A mesh or net made from synthetic resin is incorporated into the paste which fills the interstices in the grid. The mesh is laid on the surface of the grid and pressed or rolled to incorporate it therein. The mesh may be in the form of fine cloth or as very thin and open non-woven fabric made from randomly-orientated fibres joined by fusion or a chemically resistant cement. Various thermo-plastic resins are specified as suitable material from which the fibres can be made.

643 Battery Plate — **T. E. Jones**

Australian Patent 50,270/59

This plate consists of a metallic bridge connected to a number of bars. The bars are surrounded by perforated grids of acid resistant material and the paste is retained within pockets in the grids and in contact with the bars.

644 Grid Alloys — **Accumulatoren-Fabrik A.G.**

German Patent 1,097,694

An alloy given in German Patent 1,046,890 containing 5–8% antimony, 0.075–0.1% arsenic, 0.04–0.12% copper, balance lead, is claimed to be resistant to anodic oxidation. The present patent claims that the tempering time of 3–14 days previously thought necessary for this material can be greatly reduced if the grid, immediately after casting, is sprayed with, or immersed in, water.

645 Grid Alloys **Accumulatoren-Fabrik A.G.**

German Patent 1,097,695

The tempering time of the alloy mentioned in the above patent may be further reduced by subjecting the grid before or during heat treatment to mechanical strain or ultrasonic waves.

ELECTROLYSIS

646 Lead Dioxide Electrode **Pennsalt Chemicals Corp.**

German Patent 1,094,245

A lead dioxide electrode for use, say, as an anode in the electrolyticaoxidation of chlorates may be made by depositing a layer of lead dioxide on to a Tantalum support which may be either a sheet or a rod. In an example quoted, the lead dioxide is electrolytically deposited from an aqueous solution of lead nitrate and the Tantalum sheet is backed by perspex.

EXTRACTION

647 **Sherritt Gordon Mines Ltd.**

Belgian Patent 588,209

A lead compound, such as a sulphate, chloride, nitrate or oxide, can be dissolved in an aqueous solution of an alkylene or alkanol amine or a salt thereof. Similarly, galena may be dissolved, but it is first converted to lead sulphate by the conventional method. From the solution so formed, lead may be precipitated by carbon dioxide and thus used as a starting material for further lead compounds or reduced to metallic lead.

REFINING

648 Purification of Lead-Tin-Antimony Alloys **Soc. Française des Métaux et Alliages Blancs**

British Patent 860,858

Copper and nickel may be separated from alloys of lead, antimony and tin by heating an intimate mixture of the alloy and a material containing oxygen and sulphur, together with a flux, when a matte is produced by the copper and nickel while the lead, antimony and tin form a slag. Sulphur and oxygen can be provided by a number of compounds which can include calcium sulphate (plaster of Paris). By means of the latter the material can be made into bricks which are convenient for loading into a high temperature furnace. In further operations the slag is reduced in a reverberatory furnace and the matte treated in a converter.

SOLDERS

649 Soldering Printed Circuits — **Pye Ltd.**

British Patent 833,333

The plate on which the circuit is printed is curved and mounted on a pendulum. It is swung in front of a flux gun and then over the surface of molten solder.

650 Soldering of Wires to Circuits — **Philco Corporation**

British Patent 833,754

The circuit panel is covered by a mask having apertures at the location of the joints. The component is then dip soldered.

651 Fluxes for Aluminium — **Johnson & Phillips Ltd. and Whiffen & Sons Ltd.**

British Patent 834,031

65–94.5% of this flux consists of halides of tin, lead, zinc or cadmium, 5–30% of non-metallic halides (of ammonium or hydrazine), and 0.5–5% of hydrazine hydrofluoride.

TETRAETHYL LEAD

652 Tetraethyl Lead — **Ethyl Corporation**

British Patent 859,478

This improvement to British Patent 824,849 consists of reacting the constituents, a lead organo acid salt and an organo metallic compound to form a lead compound, say, lead tetra alkyl in the presence of an ether, preferably a polyether.